

so well done. The oxygen apparatus had much better have been left out, and experiments made on some more accessible peak. Never yet used under natural conditions at any elevation, it is complicated, and as four bottles weigh 32 lbs., impossible to work, for it seems to me the surveyor or climber carrying it would be unable to use his eyes or observe anything at the most critical time and under the most critical conditions.

I conclude with some remarks on the nomenclature of peaks. In the pages of the book and on Map 2, a large-scale one of Mt. Everest, constructed at the Royal Geographical Society, are the names Pumori, Ri-Ring, etc. In the May number of the *Alpine Journal* these, eleven in number, are explained (p. 228) in a contribution by Mr. Arthur R. Hinks, secretary of the R.G.S. They are all fictitious, and after all that has been written on the subject of nomenclatures I cannot too strongly condemn their creation, although they have had the criticism of Sir Charles Bell. Henceforward it will be no longer possible to distinguish between a *bona fide* Tibetan name and these inventions, unless as is adopted in natural history, the name of a species is followed by the name of its describer. The English names of Conway, Bullock Workman, and Dr. de Filippi, such as "Ogre Peak," "Mitre Peak," "The Bride," etc., are of a higher inoffensive order, and I for one see no reason why they should not be accepted. Will these new-coined names please the Tibetans, lay or sacerdotal? They may possibly give offence. Should we as a nation be pleased to see some foreign power mapping this country and giving names to our hills and valleys? I now come to the last name assigned to Mount Everest, "Chomo Lungma." It is not a happy one for a peak though quite correct in the passport issued by the Dalai Lama's Prime Minister, and very applicable to the country, a series of valleys round the great peak, which the Expedition was to work in. Lungma and Lungpa is a common name for a valley from Scardo eastward, and on Sheet 29A, N.E. of part of Baltistan and Little Tibet will be found a similar name, "Chogo Loongma," for the great glacier valley which ends at Arundo. Substitute "Chomo," feminine prefix (god-dess) for "chogo" (large), there is a close resemblance, but neither is applicable to the summit of a mountain.

I am glad the Survey of India did not rush at the discovery of this name and adopt it. Mallory thus records on p. 225: "In the Sahib's tent that night there took place a long and fragmentary conversation with the headman, our sirdar acting as interpreter. We gained one piece of information: there were two chomolungmas," that is, valleys. Every valley has its name in Tibet, where they go with their flocks and herds, but peaks are not so universally noticed and distinguished. While the R.G.S. is publishing on maps

new names for Himalayan peaks, I notice comparison with Peak K2 occurs on p. 309. This, the second highest peak in the Himalaya, received the name of Godwin-Austen. At a meeting of the Royal Geographical Society, when Lieut. Younghusband read his paper, "From China through Tibet to Kashmir," I was present, and pointed out, on a large-scale plan I had prepared, the great size of the Baltoro Glacier and the position of the great peak near the source. Then followed the proposal of General J. T. Walker, R.E., the late Surveyor-General of India, under whom I had served, seconded by Sir Henry Rawlinson, president, in the chair, put to the meeting and carried unanimously. It was a great honour, an unexpected recognition of my survey work, and was deemed worthy of notice, appearing in a short time in the "Times Atlas" and in a German one. By degrees the R.G.S. has discarded my name; this book does the same; geographical record is wiped out, and leaves me to regret I was present that evening. The Indian Survey, carrying out rules of their own, correctly recognise no other name than Mount Everest; for the rest they must be of true native origin. H. H. G.-A.

### The Early Metal Ages in South America.

*The Copper and Bronze Ages of South America.* By Erland Nordenskiöld. (Comparative Ethnographical Studies, 4.) Pp. viii+197. (London: Oxford University Press, 1921.) 18s. 6d. net.

THERE has long been felt the want of a general summary of information relative to the employment of copper and bronze in South America, and Dr. Erland Nordenskiöld's volume will be welcomed as, to a great extent, filling the gap. In about 200 pages he has brought together a considerable mass of detailed information derived from the historical record, from representations of metal objects on textiles, pottery, etc., and from the actual implements and ornaments of copper and bronze. He discusses the problem from a variety of points of view, each chapter dealing with a particular line of inquiry.

The chronological horizons of S. American antiquities are as yet, unfortunately, insufficiently defined, and much spade-work will be required before the sequence of cultures and their relationship to one another can satisfactorily be established. The author, in dealing with this aspect of the inquiry, has made use of such evidence as is to hand and offers deductions which are often very suggestive, especially when the chronological evidence is correlated with the data derived from the study of geographical distribution of types, to which Dr. Nordenskiöld has devoted special attention.

Perhaps the most valuable portion of the present volume is that which is concerned with the chemical analyses of the metal objects. A considerable number of analyses of implements, weapons, and ornaments, the basic material of which is copper, is now available, and comparisons can be made of the percentages of tin combined with copper to yield different qualities of bronze. From the data supplied it will be seen that in the New World bronze objects the proportion of tin to copper varies exceedingly. In some instances it is so small as to make it doubtful whether the alloy can be intentional; and, in such cases, it may, perhaps, be legitimate to include the objects in the category of "pure copper." In others an unusually high percentage of tin is revealed (55.60 per cent. having been recorded by Ambrosetti in one chisel), though frequently it is the ornamental objects which contain a high proportion of tin. As Dr. Nordenskiöld points out, from the results of experiment, copper with a slight admixture of tin can be hardened effectually by hammering. In fact, for the manufacture of implements designed for hard usage (cutting tools, etc.) a relatively low percentage of the alloy, combined with the process of compacting the metal by hammering, seems to give the most satisfactory results. The hardness of various objects of copper and bronze was tested experimentally with a Brinell press, and the tests were applied to different parts of the same implement, the results showing that the edge was hardened more than the rest, as might be expected.

It is clear from the capriciously variable percentages of tin that the alloying of copper with this metal was not fully understood, and that the metallurgy of bronze was still for the most part in an experimental stage in South America.

The author endeavours to prove that throughout the territory of the Inca empire the Bronze-age was preceded by an age of pure copper. He makes out an interesting case, but this point can be settled finally only by stratigraphical evidence. Much of the argument is based upon typological classification and geographical distribution of types, which, together with analyses of the metals, form a powerful combination in suggesting sequences, though they cannot prove actual chronological successions.

An interesting typological sequence is afforded by certain socket axe-blades of copper, in which the decorative treatment preserves the memory of an earlier method of hafting, by means of a collar of stitched raw-hide or leather. The form of the leather collar, which suggested the socket in this type of axe, and also the thong-stitches, are realistically represented on the later copper blades, although the latter were entirely of metal and cast in one piece.

The book has suffered somewhat at the hands of both translator and printer. Several sentences are very obscure in their meaning, and misprints and other blemishes are unduly abundant. Such an expression as "bronze (pure copper)" surely should not occur in a treatise which aims at differentiating between the alloyed and the pure metal. This expression occurs more than once and tends to obscure the issue and weaken the argument.

In spite, however, of the avoidable blemishes which occur in this translated version, the book is of real value and throws light upon a very interesting archaeological problem. The volume is profusely illustrated, though the figures are of unequal merit, and contains maps and tables which are very helpful. There is also a bibliography.

HENRY BALFOUR.

### A Monument to a Master Chemist.

*Untersuchungen über Kohlenhydrate und Fermente II.* (1908-1919). Von Emil Fischer. Herausgegeben von M. Bergmann. Pp. ix+534. (Berlin: J. Springer, 1922.) Germany, 186 marks; England, 22s. 6d.

IT is an accepted fact in art and literature that, apart from the vagaries of fashion, only a future generation can properly assess the ultimate fame of artist or author. This is no doubt equally true in science, yet we are already sure that time will only serve to enhance the reputation of Emil Fischer. The remarkable official account of his life and work, written for the German Chemical Society by Kurt Hoesch, and the biographical fragment "Aus meinem Leben" left by Fischer himself, afford a unique store of material: when properly digested in this country by those competent to understand it, this should make it possible to obtain a clear view of his personality and attainments which will be free from the natural patriotic bias of his own countrymen.

During his lifetime Fischer, who was not without a characteristic strain of personal vanity, issued in book form reprints of his work on the sugars, proteins, purins, and tannins, including in the first papers published up to the end of 1908. Dr. M. Bergmann, a very loyal fellow-worker, has now collected the later sugar papers from 1908 onwards. To workers in this field, the advantage of possessing these volumes is very great, and science owes a debt of gratitude to Dr. Bergmann for completing them.

The sugars were Fischer's first love, though not the subject of his earliest work; to his work with phenylhydrazine he owed the chronic illness which had so great an effect on his daily life, causing him for a time to abandon their study, first for that of the de-